

WHAT IS CLAIMED IS:

1. A method of generating a multiple of a unit U , N times U , by a digital circuit, where U is a rational number and N is a natural number, comprising the steps of:
 - storing values A , B and C , where A , B and C are natural numbers, $A > 1$, $B > C$ and $U = A + C/B$,
 - generating a multiple of A , N times A , and a multiple of C , N times C ,
 - comparing the value B with the multiple of C ,
 - modifying the multiple of A according to the result of the comparing step; and
 - outputting the modified multiple of A as the multiple of U .
2. The method claimed in claim 1, wherein when the result of the comparing step is that the multiple of C is equal to or larger than the value B , the modifying step comprising the steps of:
 - modifying the multiple of A ; and
 - subtracting the value B from the multiple of C .
3. The method claimed in claim 1, wherein when the result of the comparing step is that the multiple of C is equal to or larger than a value MB , where M is a predetermined natural number, the modifying step comprising the steps of:
 - modifying the multiple of A ; and
 - subtracting the value MB from the multiple of C .
4. The method claimed in claim 1, wherein the C/B represents a repeating decimal.
5. A method of generating a dependent variable of a periodic function whose independent variable is a multiple of a unit U , N times U , by a digital circuit, where U is a rational number and N is a natural number, comprising the steps of:

storing values A , B and C , where A , B and C are natural numbers, $A > 1$, $B > C$ and $U = A + C/B$;

generating a multiple of A , N times A , and a multiple of C , N times C ;

comparing the value B with the multiple of C ;

modifying the multiple of A according to the result of the comparing step; and

extracting a value corresponding to the modified multiple of A from a function table, which represents relationship between the dependent and independent variables of the periodic function and is previously stored in a memory device, as the dependent variable corresponding to the multiple of U .

6. The method claimed in claim 5, wherein when the result of the comparing step is that the multiple of C is equal to or larger than the value B , the modifying step comprising the steps of:

modifying the multiple of A ; and

subtracting the value B from the multiple of C .

7. The method claimed in claim 5, wherein when the result of the comparing step is that the multiple of C is equal to or larger than a value MB , where M is a predetermined natural number, the modifying step comprising the steps of:

modifying the multiple of A ; and

subtracting the value MB from the multiple of C .

8. The method claimed in claim 5, wherein the C/B represents a repeating decimal.

9. A digital circuit for generating a multiple of a unit U , N times U , where U is a rational number and N is a natural number, comprising:

first, second and third registers for storing values A , B and C , respectively, where A , B and C are natural numbers, $A > 1$, $B > C$ and $U = A + C/B$;

first and second calculating circuits for generating a multiple of A , N times A , and a multiple of C , N times C , respectively;

a subtractor for generating a difference between the multiple of C and the value B ; and

a modifying circuit for modifying the multiple of A according to the output of the subtractor, wherein the first calculating circuit outputs the modified multiple of A as the multiple of U .

10. The digital circuit claimed in claim 9, wherein:

the first calculating circuit comprises an accumulator and an adder that adds the value stored in the first register to the value stored in the accumulator; and

the modifying circuit directs the adder to add +1 to its output when the output of the subtractor represents that the multiple of C is equal to or larger than the value B .

11. The digital circuit claimed in claim 9, wherein:

the first calculating circuit comprises an accumulator and an adder;

the modifying circuit comprises an adjusting circuit for adjusting the value stored in the first register with reference to a predetermined value, and a selector for selecting one of the outputs of the adder and the adjusting circuit according to the output of the subtractor; and

the adder adds the value stored in the accumulator to the output of the selector.

12. The digital circuit claimed in claim 9, wherein:

the first calculating circuit comprises an accumulator and an adder;

the modifying circuit comprises a fourth register for storing a value which is different from the value A , and a selector for

selecting one of the values stored in the first and fourth registers according to the output of the subtractor; and

the adder adds the value stored in the accumulator to the output of the selector.

13. The digital circuit claimed in claim 9, wherein the C/B represents a repeating decimal.

14. A digital circuit for generating a dependent variable of a periodic function whose independent variable is a multiple of a unit U , N times U , where U is a rational number and N is a natural number, comprising:

first, second and third registers for storing values A , B and C respectively, where A , B and C are natural numbers, $A > 1$, $B > C$ and $U = A + C/B$;

first and second calculating circuits for generating a multiple of A , N times A , and a multiple of C , N times C , respectively;

a subtractor for generating a difference between the multiple of C and the value B ;

a modifying circuit for modifying the multiple of A according to the output of the subtractor; and

a memory device for storing a function table which represents relationship between the dependent and independent variables of the periodic function and for outputting a value corresponding to the modified multiple of A on the function table as the dependent variable corresponding to the multiple of U .

15. The digital circuit claimed in claim 14, wherein:

the first calculating circuit comprises an accumulator and an adder that adds the value stored in the first register to the value stored in the accumulator; and

the modifying circuit directs the adder to add +1 to its output when the output of the subtractor represents that the

multiple of C is equal to or larger than the value B .

16. The digital circuit claimed in claim 14, wherein:

the first calculating circuit comprises an accumulator and an adder;

the modifying circuit comprises an adjusting circuit for adjusting the value stored in the first register with reference to a predetermined value, and a selector for selecting one of the outputs of the adder and the adjusting circuit according to the output of the subtractor; and

the adder adds the value stored in the accumulator to the output of the selector.

17. The digital circuit claimed in claim 14, wherein:

the first calculating circuit comprises an accumulator and an adder;

the modifying circuit comprises a fourth register for storing a value which is different from the value A , and a selector for selecting one of the values stored in the first and fourth registers according to the output of the subtractor; and

the adder adds the value stored in the accumulator to the output of the selector.

18. The digital circuit claimed in claim 14, wherein the C/B represents a repeating decimal.